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to the Atlantic, its mouth would be in New England, one of the most thickly peopled and highly developed parts of North America. Instead, its mouth is in a region which has little attraction for men and industries. In the direction of its flow the great river has two components—one eastward and one northward; the former gives it its chief usefulness, the latter imposes a serious limitation upon that usefulness. I have often wondered what differences in international boundaries, what differences in the course of history in Canada and the United States, might have resulted if the St. Lawrence had continued to flow through the Hudson-Mohawk Valley as it did at one stage of the Glacial Period.

THE NEW YORK STATE BARGE CANAL*

By WILFRED H. SCHOFF
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On the basis of direct return, the State of New York cannot expect to receive a profit as it did from the old Erie system, because of the constitutional provision that prohibits the levying of tolls. The return from the present investment of $140,000,000, or thereabouts, must come in the general stimulation of industry and commerce, and in the influence brought to bear in reducing the cost of freight delivery, not only to the port of New York, but to and between all the traffic centers along the waterway system. The short line railroads between New York and Buffalo pass through no such chains of thickly settled communities as have been built up along the line of the Erie Canal. In 1898, when the committee on canals submitted its report, it showed assessed valuations in counties adjacent to the canal and Hudson River amounting to $4,412,000,000 as compared with only $485,000,000 in counties not adjacent, or 90.07 per cent. of the total assessment for the canal counties. This condition has been accentuated in recent years with the building of railroads paralleling the canal. In 1870, for example, the percentage was 87.7 for the canal counties; in 1880, 85.0; in 1890, 85.1. Of the total population in New York State in 1898, 82.2 per cent. resided in the canal counties, and this proportion is practically the same today. These figures clearly explain the overwhelming vote by which the State Legislature decided to undertake the reconstruction of the canal. This same condition provides the strongest foundation for the belief that a large tonnage will be developed on the new Barge Canal system from its own territory, and that the utility and advantage of the canal is in very little measure dependent on the through traffic from lake to seaboard which originally provided the greater part of the canal tonnage.

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* Concluded from pp. 321–333 and 498–508.

The growth and decline of the Erie Canal tonnage has been discussed in this paper (pp. 326-327). The traffic steadily grew until the banner year of 1872, remaining at about the same level for the following decade, and subsequently falling off until in 1913 the traffic had fallen to a lower figure than that reported for 1850. It is only fair to remember, however, that canal statistics during the period of reconstruction have very little bearing on the question of its traffic value. Since the work of reconstruction began, many barges have become worn out and barge owners would naturally not invest money in replacing them until the full dimensions of the new waterway should become available.

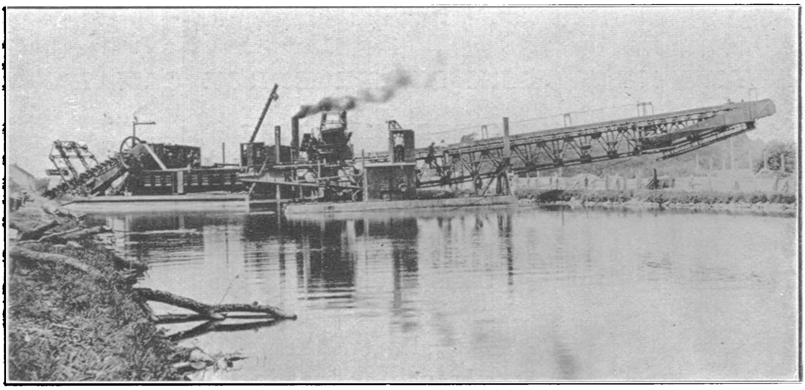

Fig. 13—Barge Canal excavation. Ladder dredge and conveyor.

As already noted, the new Barge Canal system has been calculated on an assumed traffic of 10,000,000 tons per year, with a maximum capacity around 20,000,000. Yet even these maximum figures seem almost insignificant when compared with the railroad freight tonnage of New York. In 1890 the canals of New York carried only 9.3 per cent. and in 1898 only 5 per cent. of the tonnage. The railroads were carrying all but a small fraction of the grain and flour and nearly three-fourths of the lumber. In other words, before New York State embarked in the Barge Canal enterprise, the Erie Canal had not only ceased to be a factor of importance in the export grain trade, but its tonnage had fallen below that of nearly all the railroads having New York terminals. The same condition was shown by the Buffalo figures of movement of food-stuffs. These facts reflect a general change in the economic condition of the country. While in the earlier years western grain was raised chiefly in areas within easy access of the Great Lakes, and naturally sought the lake route for shipment, the subsequent settlement of great wheat areas in the western and northwestern states developed a traffic which in any case required a long rail haul, and for the moving of which the lake route could offer less inducement. This traffic might go all rail to New York, or it might be deflected to seaports nearer the interior, such as Philadelphia and Baltimore, or in less degree Charleston, Savannah and New Orleans. On the other hand, the rapid increase in size of the lake freighters brought about a greater saving for the water haul on the lakes than for the eastern section of the water haul by canal, so that the several railroad lines operating between Buffalo and New York made great inroads into the canal tonnage. That these conditions tended to deflect a great tonnage from the port of New York is evident from the following table:

FLOUR AND GRAIN MOVEMENT TO ATLANTIC AND GULF PORTS

In thousands of bushels

	Total New York	New York Canal	Canal Per Cent.	Other Ports	Total
1870..........	69,921	37,491	53.6	61,077	130,998
1880..........	169,042	69,440	41.1	170,775	339,868
1890..........	122,013	30,185	24.7	140,690	262,704
1898	195,407	19,407	10.0	278,494	473,902

These figures explain the importance of canal efficiency as regards New York's position in the export grain trade, and the keen interest of the commercial bodies of New York City in supporting the canal reconstruction movement.

But the export grain trade no longer holds its former importance. Corn, by far the largest grain crop in the United States, has always been consumed chiefly within our own borders, going abroad only to make good shortages elsewhere. In 1913, for example, of the total production of 3,124,000,000 bushels, only 50,000,000 went abroad. The wheat crop, formerly one of our chief items of export, is being absorbed at home in increasing measure, and our available export balance is now hardly more than half that of fifteen years ago.

The general relation of the Erie Canal to our railroad systems is vastly different from that of earlier years. In 1870 there were in the United States less than 53,000 miles of railroad; in 1912 the mileage was 258,033. Of this great mileage a large proportion is little interested in the lake trade, but the greater part of it, in some way, is in physical connection with the port of New York. The rapid growth in efficiency of the railroad systems is also evident. In 1910 the freight carried on railroads in the United States amounted to 1,849.9 millions, or practically treble the figures of 1890. Within the same period the general tendency of freight cost was downward. This increased efficiency in railroad transportation is the result of extensive reconstruction of lines and of the great improvements made in motive power and steel freight cars of large capacity, so that the positive restraining influence of water competition is less marked than formerly. In 1910 the all rail rate on wheat, Chicago to New York, had fallen to 9.6 cts., lake and rail 6.57 cts. and lake and canal to 5.13 cts., leaving a balance of only 3.47 cts. per bushel in favor of the water route, a margin which might be wiped out by many other elements entering into the final cost of delivery.

The traffic figures of any important railroad system show that the way traffic far exceeds the through traffic; the local business is what keeps the railroad going, and indeed often provides the means of carrying the through business at competitive figures. The tonnage of an average system competing as to fairly fixed areas of business with other systems, is naturally larger within its own territory than in territory supplied from competing systems. The Pennsylvania Railroad system reports more than 90 per cent. of its total business, way traffic; the New York Central, over 80 per cent. and so on. The same tendency, although naturally in less degree, is shown by the figures of Erie Canal traffic. In 1898, the year of the canal committee's report, which showed the through traffic cut in two, the way traffic had fallen off much less, figures being 1,573,227 for the through business and 1,786,836 for the way. It was this condition which led the committee to predict:

> ''The local tonnage on the canals has for many years exceeded the through tonnage, just as it does on the railroads, although not to the same extent; and an enterprising transportation line, skillfully managed, could give an enormous

development to this local traffic at profitable prices, and thus be in position, just as the railroads are, to carry through freight of low grade at cost or less in case of necessity.''

It is a remarkable fact that, with through business on the old Erie Canal almost at the vanishing point, with all barge construction held up until the new canal system shall be ready for service, the internal movement has continued to increase, showing a gain in the past decade of about 50 per cent., thus fully bearing out, under the most adverse conditions, the committee's remark:

> ''The canals have been largely limited in the past to the lower grades of freight, and this is equally true of transportation on the lakes. There is no reason why the canals, if enlarged and properly managed, should not compete for the higher grades of freight, which, at prices far below those charged by the railroad, would bring very profitable returns on the lakes and canals. * * * With the canal enlarged so as to carry boats of 1,000 tons each assembled in fleets of four or six, with detached mechanical motive power, it will be possible to send a boatload of freight of the highest or lowest class through from any point on the lakes to any point on the Atlantic Coast.''

New York State has fully appreciated the importance of the way traffic on the Barge Canal system by providing for the construction of public water terminals at many points along the canal and at tide water, thus facilitating free delivery of freight to or from canal barges. It is reasonable to expect that New York, through the traffic developed within its own borders, will find itself amply justified for its great expenditure in Barge Canal reconstruction. But there are other important sources of tonnage. The transportation of building materials of all kinds, of bricks and coal products generally, produced in great volume in the Hudson Valley, of cement, sand, lime and lumber (even of Pacific Coast lumber coming through the Panama Canal), of pulp-wood from the Champlain district in Canada, marble and other stone from the same region, and iron ore from nearby mines, will all contribute largely. Indeed, the delivery of Lake Superior ore at tide water where it can be most economically used in connection with the Cuban, Chilean, Spanish, Swedish and other foreign ores, may give a positive advantage to tide-water steel plants, and the developmnt of such plants along the waterways between Raritan and Newark Bays is highly probable.

Finally, it is as an essential link in a much larger system that the New York Barge Canal must also be considered. Pursuant to acts of Congress the Army Engineers have completed surveys for an intracoastal waterway system to provide barge transportation along the entire Atlantic seaboard between New England and Florida, so that barges of standard dimensions passing through New York may continue through Long Island Sound to New Haven, New London, Providence, Fall River and New Bedford, and through the new Cape Cod Canal even to Boston; while in the opposite direction such barges will pass from Raritan Bay across New Jersey to the Delaware River and Bay, thence across the Delaware and Maryland peninsula to Chesapeake Bay, and from Hampton Roads into the sounds of North Carolina and out into the Atlantic Ocean at Beaufort Inlet below Cape Hatteras. This will ultimately be a sea-level protected passage of twelve feet depth, the same as the New York canals, and it will be extended through the southern thoroughfares and perhaps even to the southern extremity of Florida on somewhat smaller dimensions, the depth recommended being 7 feet owing to the smaller tonnage and the difficulty of maintaining deeper channels in the southern sounds.

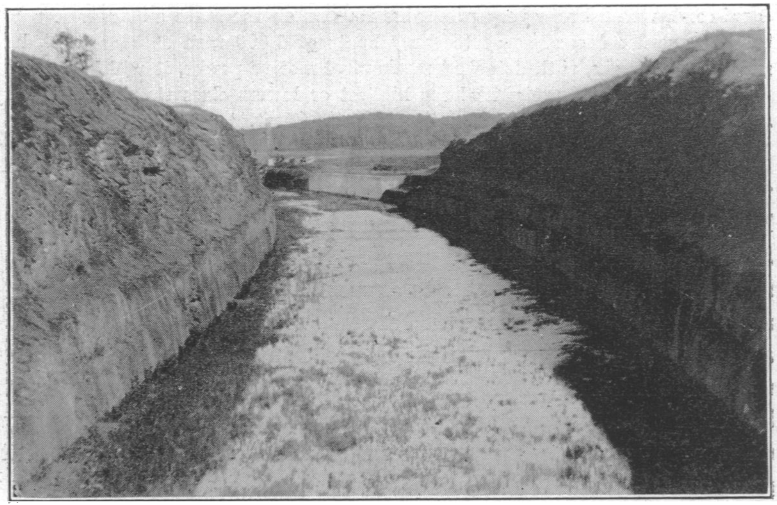

Fig. 14—"A miniature Culebra Cut" by which the Barge Canal leaves the Mohawk River to reach the Waterford locks.

This is a large undertaking and there is reason to believe that Congress will provide for continuing the work until it is finished. Thus the entire Great Lakes traffic will be extended through the Barge Canal up and down the Atlantic seaboard, so that the barge laden with southern pine may deliver its cargo in Boston or Providence, in Albany or Buffalo, while steam coal and anthracite now taken on ocean barges from Norfolk, Newport News, Baltimore and

Philadelphia for coastwise delivery, would be available at water freight rates for interior delivery, stimulating industry.

There is reason to believe that the Barge Canal will rank permanently among the world's busiest waterways. The communities that will be chiefly benefited are those within the boundaries of New York State, but the entire Great Lakes and St. Lawrence region and the Atlantic seaboard will be helped and stimulated. As a regulator of freight rates the Barge Canal will perform important service. Even though rail rates, through increased efficiency of operation, have steadily declined and the margin between rail and water rates is less than it was, it is the water competition that still determines the rate. Without an Erie Canal, rates between New York, Buffalo and intermediate points would never have fallen to their present level, and if the canal were closed, they would surely tend to rise. This would mean deflection of tonnage to other ports, at the expense of New York.

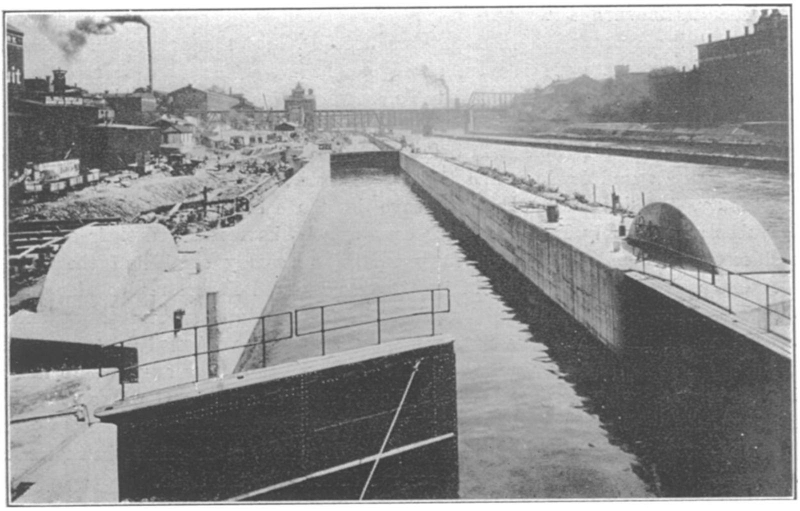

Fig. 15—Siphon lock, Oswego, N. Y. Barge Canal entrance to Lake Ontario.

By its reconstruction of the Erie Canal, therefore, the State of New York is assuming a great liability in the belief that by stimulating commerce in many states it will gain for itself an important share of the resulting benefit, and on the assurance that any less generous policy on its part would tend to divert to other states commerce which it expects to retain for itself.